'95 Year in Review

Shuttle-Mir linkups, renewed emphasis on safety prominent

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10 people living and working together on a single space vehicle.

The Phase 1 activities, which also included groundbreaking scientific research and the delivery of a permanent Russian-built docking port that will support five more dockings, provided valuable experience that will play a critical role in preparing NASA and its partners for the start of construction of the International Space Station just two years from now. In addition, the intensive cooperation and interchange among the world's top space-faring nations provided an infusion of alternative experience and thinking that is enhancing both shuttle and station.

"I've been impressed with the fact that the things we did on this mission are exactly the sorts of things we need to do with space station," said Hoot Gibson, commander of STS-71, the first docking mission and the 100th U.S. human space flight. After setting the American record for length of stay on orbit, Norm Thagard, the first U.S. cosmonaut researcher to work aboard Mir, echoed those sentiments by saying "This is the way a space station ought to work."

JSC technicians played a pivotal role in Mir's preparations for the docking flights by fabricating both the docking target affixed to Mir and a special tool to cut through a balky retention bar on a Spektr solar array panel that had been delivered by way of a Russian rocket. The Extended Length General Purpose Cutter was put together and tested in just six days, then delivered by *Atlantis*, meriting JSC's W.B. Wood the coveted Eagle Award to be presented at the Goddard Space Flight Dinner this spring.

The year 1995 also saw another major change in the Space Shuttle Program. With significant spending reductions already putting conventional operations to the test and further budget reductions on the horizon, top NASA managers began looking for new ways of doing shuttle business. In March, an independent review panel led by legendary flight director Christopher Kraft recommended that in the interests of providing a more effective and efficient operation and a less costly one, that NASA should relinquish hands-on management control of shuttle operations to a single prime contractor. In November the agency began negotiations on a non-competitive contract for those services with the United Space Alliance, a consortium led by Rockwell International and Lockheed Martin.

Development of the International Space Station continued to progress throughout the year, meeting both programmatic and construction milestones. In January, NASA and Boeing signed a $5.63 billion contract for design and development through the year 2003, solidifying the role of the prime contractor and incorporating features that will reduce costs and risks. In April, the station passed its second major Incremental Design Review, which assured that the station as designed can be ferried into orbit, assembled, operated and put to use for research through the first set of assembly flights. The Government Accounting Office verified that that station is on track and under budget in June following an annual audit of the program. And in August, Boeing and Russia signed a $190 million contract that has America's former space adversary providing the first flight element of the station.

In May, the station's water purification system passed a series of tests designed to evaluate new components and challenge its ability to remove contaminants from the water, and in September, the main structure of the 28 by 14-foot, waffle-patterned U.S. laboratory module left the welding shop in one solid piece.

A number of JSC facilities and capabilities that will help lead the way for future space exploration made headway in 1995. NASA signed a lease/purchase agreement with McDonnell Douglas Corp. to acquire land and buildings at Ellington Field for a long-awaited Neutral Buoyancy Laboratory that will become the proving ground for station assembly practices and equipment. In April, the facility was named the Sonny Carter Training Facility in honor of the unique and talented astronaut who was lost in a 1991 plane crash.

The new Mission Control Center in Bldg. 30 made its debut in July following the deployment of a Tracking and Data Relay Satellite that was controlled from the original Mission Control during STS-70. Flight controllers vacated the historic venue, which for three decades had been the scene of countless accomplishments and drama, and walked down the hallway to a room decked with Alpha workstations, where they successfully oversaw the remainder of the orbit activities before returning the original room just before landing. Conversion to the new facility, which uses state-of-the-industry interchangeable computer workstations, has since gone extremely well, and this year the original control center will be phased out entirely.

In August, Goldin announced plans to establish a new science institute for space life sciences, based at JSC, in an effort to streamline the agency's management structure and improve the overall quality of scientific research. Envisioned as a privatized arrangement under which researchers from universities or industry use government-owned assets to conduct and share their research, the institute is to be the centerpiece of NASA's strategy to foster world-class life sciences research in support of human space exploration.

Also in August, Lockheed-Martin life support systems scientist Nigel Packham gained world-wide notoriety by living in a closed-loop atmosphere for 15 days, breathing oxygen recycled entirely by about 30,000 thriving wheat plants. The regenerative life support systems test in Bldg. 7 was the first in a series of tests of advanced technologies that will be required for long-duration space flight permanent bases on the Moon or Mars.

Along the same lines, JSC fashioned a new technical test bed in October that will provide scientists and engineers with a place to perform research into the use of extraterrestrial resources to live off the land on alien worlds. Called the Mars In-Situ Resource Utilization System Technology Breadboard Program, the test bed is a direct response to the challenge of using new technologies and management approaches to reduce the cost of human exploration of the Moon and Mars.

Cutting costs was a continuing theme throughout the year as ever tightening budgets began forcing NASA to pare itself down to a size it hasn't seen since the early Apollo years. The fiscal 1996 budget for the agency was $14.26 billion, down 1.4 percent from the previous year. In January, all federal agencies began to respond to legislation designed to cut more than 270,000 employees—or about 12 percent of the government's work force—by the end of the decade. At NASA, the call led to additional reorganization efforts and renewed emphasis to ongoing efforts to find new, more efficient ways of doing things. A second round of buy-outs, intended to allow retirement-eligible employees additional incentives, was offered in February. In March, President Clinton called NASA a role model in the reinvention of government under the auspices of the National Performance Review.

"The tough news is that we will make fundamental changes at NASA to absorb future cuts," Goldin said. "Make no mistake; when this is over, NASA will be profoundly different. We're going to restructure the agency, but the NASA that emerges is going to be better than ever."

Senior NASA managers conducted an all-encompassing Zero-Base Review, looking for innovative ways to streamline operations, reduce overlap and significantly cut costs while delivering quality and balance in its programs. The open peer review cut across all programs and objectives, leaving no stone unturned and seeking savings in every area. Each NASA center becomes a "center of excellence," concentrating on specific aspects of NASA's mission, while administrative and program functions are consolidated to save money.

In the midst of extensive belt-tightening efforts, JSC implemented a far-reaching effort to improve safety. Following last year's release of toxic gas from the Thermochemical Test Area, the ensuing safety review produced recommendations which led to renewed emphasis on making the center a decidedly safer place to work.

Examples of the new "safety attitude" included a crackdown on curb-side parking designed to increase pedestrian safety, the creation of a new close calls reporting procedure designed to flag areas of concern before accidents occur and the installation of a state-of-the-art siren system to alert employees and the surrounding community to imminent danger from weather or hazardous chemicals. The first Director's Safety Page—the name will be changed with this year's first issue—made its debut in the Space News Roundup in June, as managers and employees shared information and ideas about the subject. The exchange continued Aug. 30 when the entire center took a "time out" for the first Safety Awareness Day.

For most of the year, JSC employees continued to work ambitious schedules toward well-defined goals and objectives. Even with two year-end government employee furloughs which forced many civil servants to stay home from work, the shuttle manifest and the space station development schedule remained on track thanks to the efforts of the contractor workforce and exempted civil servants.

The year of dedication and hard work by the JSC team was recognized by those outside the agency, with solid support in Congress for the space station program serving as one bellweather.

The comment cards returned following the JSC Open House showed a common healthy interest in space exploration among the general public. Ninety percent said they believe government-funded space activities provide many economic benefits to the national economy.

Such interest and enthusiasm shows that NASA's continued accomplishments and productivity are appreciated by a public that understands and appreciates the groundwork its people are laying for 1996 and beyond. ❑

From top to bottom, left to right: 1) STS-71 Commander Hoot Gibson shakes hands with Mir 18 Commander Vladimir Dezhurov just minutes after the hatches between *Atlantis* and Mir were opened. The June 29 docking of the American shuttle to the Russian outpost was one of many historic moments in space flight during 1995. 2) Norm Thagard, the first American aboard the Russian Mir Space Station, spends part of his 115 days in space exercising. 3) Test subject Nigel Packham displays a handful of the 30,000 wheat plants that produced oxygen for him during a 15-day regenerative life support systems test in Bldg. 7. The plants actually produced twice as much oxygen as Packham needed. The test, completed Aug. 8, was the first of its kind at JSC in more than 25 years. 4) Visitors during JSC's Open House in August get a hands-on demonstration from Bldg. 7 space suit technicians. Visitors learned how astronauts survive in the cold temperatures of deep space.